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RELATING TO

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INSECTS, WORMS, ZOOPHYTES, &c.

THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

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THE INSECT HUNTERS:

BY

EDWARD NEWMAN, F.L.S., F.Z.S.,

LATE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY.

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O. Haliphron, *Bois.*, both sexes of which I took, and twice *in copulâ;* the female something resembles O. Amphimedon, which is the female of O. Helena. About the mud holes Hymenoptera were abundant and on the fallen palm stems; in dry gulleys, &c. were many very curious Diptera; Coleoptera, however, were not to be found: I searched dead trees, and bark and leaves, with no other reward than a very few species of minute Curculios and obscure Chrysomelidæ. After a few weeks of this work the mud holes got baked hard, the pools of water disappeared one after another, and with them the butterflies and other insects, and for some days I got almost nothing. I now set to turning over the stones and dead leaves in the sandy river-bed, and soon found that there were some minute Coleoptera under them, namely, Anthici and very small Carabidæ; to catch them I made my boy bring a basin of water and a spoon, and by shovelling in the sand I could pick off the insects which floated on the surface: in this way I got many Carabidæ, the largest not more than 1½ line; two or three species of Anthicus and some Steni and other Brachelytra. I now turned my attention to buffalo-dung, which, though very barren compared with genuine British cow-dung, would I found yield something to a persevering search,—I obtained Histers, Onthophagi, and a considerable number of minute Staphylinidæ. A few days, however, soon exhausted this collecting-ground, for, except in the river-bed, the dung was absolutely uninhabited, when chance showed me a new and very rich beetle station. My lad brought me one day a fine large Nitidula which he had found in an over-ripe jack fruit (*Artocarpus* sp.); this set me to searching these fruits, of which there were a number about in various stages of decay, and I soon found that I had made a discovery, — Staphylinidæ, large and small, Nitidulæ, Histers, Onthophagi, actually swarmed on them: every morning, for some weeks, I searched these rotten fruits, and always with more or less success; I placed ripe ones on the fruit here and there, which I visited once a day, and from some of them got even Carabidæ; in all I found not much short of one hundred species of Coleoptera on the fruit, including most that I had before found in dung, so that it seems probable that, in tropical countries, the large fleshy fruits in a state of decay and putrescence are the true stations of many of the Carpophagous and Necrophagous Coleoptera, a fact of some importance, as explaining the presence of Onthophagi, &c. in places where there are no ruminating animals: at length the rains began to fall almost every evening, and the fruits, soaked with water, ceased to be productive, but I was compensated by discovering that

BRITISH MUSEUM

the margins of the streams, which when dry were so rich in Lepidoptera, were now an excellent collecting-ground for small Coleoptera; under the moist dead leaves that lay on the rocks I found numbers of small and very interesting Carabidæ, with hosts of Anthici, and a good many Pselaphidæ and Hydrophili: with the rains the butterflies almost disappeared, while the Cicindelidæ came out in great abundance, four species being different from those I took last year; small Melolonthidæ also now became abundant on the foliage, and I took two or three species new to me, with several pretty Chrysomelas and Curculios. After a fortnight's close work at minute Coleoptera, the weather became so wet and cloudy, as to admonish my return to Macassar to pack my collections before the commencement of the continuous heavy rains.

To persons impressed with the idea of the prevalence of large insects in the tropics, my Macassar collections will appear most extraordinary; the average size is certainly less than that of our British species, and the colours not at all more brilliant. Of the Carabidæ (more than one hundred species), the greater part are under 4 lines and a very large number under 2 lines, whilst several under 1 line are perhaps the smallest of the family: the Brachelytra (eighty or ninety species) are, with the exception of about a dozen, very minute and obscure: the Rhynchophora are all small, and there are about one hundred species of minute Necrophaga, Xylophaga, &c., and about eighteen species of the elegant little Anthici, whilst the Longicornes, Buprestidæ and Cetoniæ, usually so abundant, are very scarce: if we were to take away some dozen purely tropical forms, the collection would have all the appearance of one from an extratropical and even northern locality, owing to the large proportion of Carabidæ, Staphylinidæ and Necrophaga, the small average size of the species and the obscurity of their colours.

Amboyna, where I am staying a month only, on my way to Ternate, offers a striking contrast to the country I have just quitted: it is eminently tropical; the number of large and handsome species in all orders of insects is perhaps greater than in any other place I have visited, and the forms far more closely resemble those of Aru than of Borneo or Macassar; a number of the common species of the surrounding island are represented at Amboyna by others very closely allied or by varieties, but in almost every instance they are of larger size and more brilliant colours,—Papilio Severus and Ulysses are larger here than at Aru, whilst Deiphobus is larger than the closely allied Memnon of the Sanda Island or Ascalaphus of Macassar. In the Hymenoptera, the species of Vespidæ and Pompilidæ are gayer than the allied species I have found in other countries; a Laphria and an Anthrax are larger than any Diptera I have yet found of the same genera; while the Coleoptera include the gigantic Eucheirus longimanus and a number of large and handsome Longicornes, Buprestidæ and Anthribidæ: it may be easily imagined, therefore, that Amboyna is a tempting place, well worth a thorough exploration, and I shall probably return to it unless I shall be able to visit Ceram, which I expect will contain almost all the Amboyna species, and probably many more, as is known to be the case with the birds. Though everybody says this is the dry and hot season, yet the weather has been terribly wet and windy, and during the twelve days I have now resided in a little hut in the jungle I have not had a single hot sunny day; here, as everywhere in the East, there is no forest left for many miles round the town, and there was the usual difficulty in finding a locality and a home, and in conveying my baggage. In the town I reside with Dr. Mohinke, the chief physician of the Moluccas, a German, an entomologist, and a very learned and hospitable man; he has lived in Japan, made a voyage to Jeddo, ascended volcanoes, and made collections: my pleasure may be imagined in looking over his superb collection of Japanese Coleoptera, large and handsome Longicornes and Lucani, tropical Buprestidæ and northern Carabi: he has also an extensive collection of Coleoptera made during many years' residence in Sumatra, Java, Borneo and the Moluccas — a collection that makes me despair; such series of huge Prioni, Lamiæ and Lucani, Dynastidæ and Eucheirus! It is such collections that give, and have always given, such an erroneous idea of Tropical Entomology: these collections are made entirely by natives. Dr. Mohinke has resided here in Amboyna, for example, *two* years, and every native in the island knows that large and handsome beetles will be purchased by him; he has, therefore, hundreds of eyes spread over hundreds of square miles, and thus species which in ten years might never once occur to a single collector, are inevitably obtained by him in greater or less abundance, whilst the smaller, more active, and much more common species are never brought at all. The Euchejrus is evidently rare, yet Dr. Mohinke has a fine series, obtained at intervals from different localities; he also sends bottles and casks of arrack to the Dutch officers resident in different islands, and though he sometimes has them returned crammed full of a single species of common Calandra or Passalus, yet he occasionally gets some magnificent insects. I believe myself that, as a general rule, beetles are rare exactly in proportion to their size, rare both in species and in individuals; in four years' almost daily search in the Eastern forests I have never found a large Prionus myself, and I have collected nearly four thousand species of Coleoptera: such collections as those of Mr. Bates and myself, made in such distant countries (both generally considered among the richest in large species), are what show the true nature of tropical insects, and I believe that a careful examination of these will lead to the conclusion that there is no superiority whatever in the average size of tropical Coleoptera over those of temperate climates, and that in many groups the latter have the decided advantage.

A. R. Wallace.

Scent: an attempt to explain its Properties and Causes.

By the Rev. J. C. Atkinson, M.A.

It is my purpose in the following remarks to record a few observations on the subject of Scent, with the view of leading, if possible, to further observation and inquiry into a matter generally thought, I believe, to be involved in a good deal of obscurity and uncertainty.

By scent is implied what is assumed to be an odour emanating from any specified member or members of the animal kingdom; and is, in sporting language, so far restricted in its sense as to be applied almost exclusively in the case of such animals as are the objects of pursuit in the chase or by the shooter; and, almost as exclusively, with reference to the olfactory powers of some one or other of the varieties of the dog. However, in attempting to institute an inquiry into the nature or peculiarities of Scent, it will be certainly most convenient, and possibly quite necessary, to include under that term the odorous emanations proceeding from any animal whatever, and perceptible to the sense of smell in any other animal whatever.

It is probably true that there is no existing animal without its own peculiar scent. Thus, "in most Mammalia," says Dr. Carpenter, "an odoriferous secretion, characteristic of the particular species, is formed by glandulæ which pour out their product on some part of the surface, their situation however being extremely variable in the different tribes; this secretion is usually formed most abundantly at the period of sexual excitement, and appears to be concerned in the attraction of the sexes towards each other." (General and Comp.

Phys. 448). And it is almost certain that the same remark may be extended so as to include at least all terrestrial creatures and not a few of the aquatic.

In a vast number of cases the peculiar smell, or scent, of an animal is distinctly recognisable by the human organs of smell. I do not mean simply in such notorious instances as those of the goat, the fox, the foulmart, the pig, the sheep, the rat, the mouse, the horse, and, by no means the least, man himself, but in a great number of other instances when once our attention is attracted. The rook, the starling, the dog, the cat, each has an odour distinctly recognisable by us, while, as regards the creatures specially distinguished by the appellation of game, I should think no one ever turned out the fresh contents of a well-filled game-bag without being made aware that partridges and grouse, hares and rabbits emit effluvia which must needs appeal strongly to the delicate and highly organized sense of smell in the sporting-dog. How many insects, too, are not only perceptibly odorous to us, but strongly or even disagreeably so; the gooseberry caterpillar for instance, the larva of the goat-moth, the bed-bug, the cockroach, and so on without end.

There is also, probably, a good deal of resemblance between the scents given off by different animals. How often a very good pointer who is allowed, or indeed required by his master, to point at other game besides partridges, is misled, on the cultivated land, by a common fowl, a lark, a waterhen, or even sometimes one of the smaller Conirostres; on the moor by a golden plover or a titlark. Many dogs too will point at snipe. I once saw one of mine make such a point, and he seemed as much surprised at my shooting it as if I had shot at a lark at which he had mistakenly pointed. I never saw him point at another, nor willingly notice one when shot, though I had killed many couple at different times when he was with me. Woodcocks he would point, but evidently considered, on ascertaining what the fallen bird was, that both he and I had made a mistake, though not such a disgraceful one as in the case of the snipe.*

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* It was, most evidently, a source of the keenest delight to this dog to have to hunt a wounded partridge, grouse, or pheasant: and the consummation of all was when he had caught the bird and held it in his mouth; his eye, his tail, his whole bearing displayed extreme gratification: a wounded snipe, however, he would not attempt to hunt; a woodcock he would look at and smell, and then "turn up his nose;" a waterhen, though apparently giving out a strong scent, he seemed to rank with the woodcock; a partridge that had fallen into the water, would be fetched out without a pause of hesitation; but by no means could he be induced to wet a foot for a waterhen or wild duck.

What the nature of this emanation or effluvium may be is a question of much difficulty; indeed, I doubt if it admits of more than hypothetical solution. There are at least two very distinct species of odours or scents,—distinct, I mean, as regards their elements and nature,—the one depending on, or rather, perhaps, consisting of a substance, whether vaporous or molecular; the other apparently without any such dependence. The former may be instanced in any so-called volatile* odorous substance, such as carbonate of ammonia or camphor; the latter in musk and two or three other substances of a somewhat similar nature: this sustains no diminution in weight, though continuously giving off its peculiar penetrating odour for a lengthened period; that sustains rapid diminution in weight as long as it remains subjected to the volatilising agencies. To which of these two classes, or whether exclusively to either, scent belongs, it seems impossible to say. The probability seems to be—and I shall give reasons for the opinion as I go on—that it partakes of both natures; that there is something in it corresponding to the substantiality of the one, and to the imponderability of the other.

General reference has already been made to the glandular odoriferous secretion peculiar to each several animal: and, in illustration of the point, I shall only adduce two or three particular instances; such, for example, as that of the fox, which "has a subcaudal gland that secretes an intolerably fetid substance, and whose urine also possesses the same intolerable odour" (Bell, Br. Quadr. 256); that of the polecat or foulmart, which derives the latter name from the fact that a "disgusting odour is produced by the exudation of a fetid secretion from a pouch or follicle under the tail, and which is even more intolerable than than that of the common weasel or the stoat" (*Id.* 159); that of the beaver, familiar to almost every one from childhood in connection with the old fable; that of man himself, from the "glands of whose axilla † is secreted, or eliminated from the blood, a peculiar odorous matter" (Kirke's 'Handbook of Physiology,' 348; Carpenter's 'Human Physiology,' 231).

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* "The most odorous substances are volatile, and *vice versâ*, * * * though there are some volatile fluids, such as water, which are entirely inodorous" (Carp. Hum. Phys. 905).

† "In certain situations the sweat-glands are very large; and, as might be expected, we find their size and number in different districts of the skin to correspond with the amount of perspiration afforded by each. Thus they are nowhere so remarkable, or so easily examined, as in the axilla, over a space precisely defined by the growth of the hair in the adult. They here form a layer, which towards the middle is often one-eighth of an inch thick." (Todd and Bowman, Phys. Anatomy, 423).

Now I believe it may be asserted with respect to almost if not quite all the odours of this class, that they are apt to be retained for an indefinite length of time in any suitably absorbent substance, *e.g.* a piece of rough woollen material. A flannel shirt, in which a man has strongly exerted himself during a long day's work, and which has consequently absorbed a large quantity of sweat, will retain a peculiar smell due to the axillary secretion, even after it has passed through the washerwoman's hands; and still more of the odour, and more powerful will be contracted, if the washing does not happen to keep pace with the work; so that two or three such garments hanging in an apartment scent the atmosphere rather too sensibly to be agreeable, and without sensible diminution of their perfuming power. But the human "peculiar odour" is faint to human nostrils—except under such circumstances of accumulation as those just adverted to—in comparison with the odours of the same class in multitudes of the lower animals. A woollen glove or over-shoe which has been wetted with a few drops of the urine of a fox or a male cat, will not only retain the offensive smell for months or years, but will give it off most freely at the expiration of those months or years under the agency of either warmth or moisture.

Now it must be borne in mind that only with scrupulous care and attention to cleanliness carried out in repeated ablutions, can most members of the human family prevent the lodgment of this peculiar smell about their persons. In other creatures who do not and cannot wash as mankind does, nor yet change their woollen garments, it is inevitable that the effluvium in question should leave a permanent odour. It therefore appears to me that in every case in which scent is given off by an animal, it will in part be due to this source; and, in so far as it is due to this source, will it be of a nature corresponding to that of the scent arising from musk, or, in other words, possessing no substantiality, and so not depending upon either vapourous or molecular matters.

But it is very necessary to bear also in mind that in all animals, except the denizens of the waters, a great amount of aqueous fluid is almost always in course of transpiration from or through the pores of the skin, and that in this transudation the aqueous matter is always accompanied or impregnated with certain solid organic matters, to the average amount possibly, in human beings, of one part in every hundred; and there is reason to believe that at leat a hundred grains of azotised matter are excreted from the human skin daily

(Carpenter, Hum. Phys. 632). The greater proportion of this solid matter appears to be a protein-compound in a state of incipient decomposition. Urea also has been detected in it. Now both urea and protein compounds, under the influence of decomposing agencies, are active as well as important elements in the production of ammonia, a distinct salt of which substance moreover is found in the azotised matter under mention. Now, processes strictly analogous—not to say identical—with this of transudation in man are known to take place in all the warm-blooded animals,* differing only, it is probable, in the degree to which, in the different classes of animals, the process is severally carried on.

Hence then we are at liberty to infer that an ammoniacal element is one of the accessories, if not constituents, of scent in the extended acceptation of the word.

It may be as well, perhaps, while noticing these peculiarities or phenomena of transudation, to notice also in this place, rather than further on, the fact that cutaneous excretion is complementary to, or vicarious with, renal excretion. Thus, Dr. Carpenter says,—"The cutaneous excretion, as already pointed out, is in great degree vicarious with the urinary, in regard to the amount of fluid eliminated; the urine being more watery in proportion as the cutaneous exhalation is diminished in amount, and *vice versâ*. But we are also to look at these two excretions as vicarious in regard to the elimination of the products of the 'waste' of the system. The share which the skin has in this office has probably been generally under-rated. There is reason to believe that at least 100 grains of azotised matter are excreted from it daily; and any cause which checks this excretion must throw additional labour on the kidneys, and will be likely to produce disorder of their function." (Hum. Phys. 631). Now in man—and there is no doubt that a perfect analogy exists in these matters between man and the lower animals—"the quantity of urea secreted at any given period of life seems to depend mainly on two conditions—namely, the degree of muscular exertion previously put forth, and the amount of azotised matter ingested as food. Thus Professer Lehman ascertained that, by the substitution of *violent* for *moderate* exercise, the quantity of urea was raised from 32½ to 45⅓ parts; and Simon found that, by two hours violent exercise, the proportion of the urea in the urine passed half an hour subsequently was double that contained in the morning urine." (*Id.* 619). Now, when an animal is subjected to pursuit in the chase, and compelled to make great and continued muscular exertion, transudation is extremely copious, while the determination of fluid to the bladder is very remarkably lessened; and when we bear in mind how great the "waste of the system" must be in an animal so situated, it seems much more than probable that, allowing for the greater proportion of urea in the small quantity of urine secreted, the excretory action of the cutaneous glandulæ also will be greatly intensified, and that, in consequence, greatly more of the azotised matter will pass off through their agency. This conclusion certainly harmonises very closely with the well-known fact, that an animal—a fox, for instance, or a hare—which has been closely and continuously hunted for some little space of time, gives off scent both stronger and more copious than at earlier periods of the chase, as also with this other, that "the huntsman has the greatest fear of losing his fox, not only at the beginning of the run before the hounds get well settled to the scent, but also when the game is sinking. The old hounds, towards the end of the run, make every effort to get to the head of the pack, for *they* know the end is at hand. Yet even then, perhaps, all at once all scent seems to be lost; the fox has got into a ditch, or even laid down upon the ground, and no dog can touch the scent, even though within a yard of the animal." The explanation seems easy enough,—the animal is exhausted; in other words, the waste of the system has continued so actively and so long, that it must of necessity come to an end, and with its cessation is contemporaneous the cessation of excretion and its dependent odour.

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* "The skin, in most of the Mammalia, is an important excreting organ, being usually furnished with a multitude of glandulæ, which discharge their products upon its surface. The products of these glandulæ vary considerably in different animals, and in different parts of the same animal. The ordinary perspiratory glands draw off watery fluid from the blood, with a small quantity of excretory matter closely resembling that which is eliminated by the kidneys." (Princ. Phys. 547. See also *Id.* 777).

In the next place I have to remark that perfect stillness or quiescence in the scent-emitting creature, if of some duration, seems to bring the emission down to the minimum, if not actually to interrupt or neutralise it. Motion, on the other hand, though not in the least degree rapid, or sustained, or energetic, appears to cause the emanation to be given out very perceptibly. A hare or rabbit on its form is often missed altogether, or run over by the pointer: if found, the dog is usually within a very few feet or even inches of the motionless creature. Several instances have occurred under my own observation, or have been related to me by others on whose accuracy, alike of observation and relation, I could fully depend, which are curious as illustrating this point. Thus one day last season I got over a gap in the fence into the corner of a field where the hedges forming the corner came together at a right angle; immediately on entering the corner my dog stood at a place in the fence running into that we had crossed, about ten or twelve feet from the angle; I crossed this fence also, and eventually got a shot at a single partridge which had run through from the point at which the dog had taken up the scent, and after running up the ditch about fifteen or twenty yards, had stopped and lay very close. 'Don' was not satisfied at finding only one bird; he seemed to be convinced there ought to be more. He tried back, over the hedge, and up the other side. I followed; but there were no more partridges to be found in that direction. Still the dog was not satisfied, and quartered every inch of the ground from the spot where he had first pointed. I thought he was mistaken, and turned back towards the gap over which I had entered the field. Now, however, it appeared that 'Don' was right, for a second bird rose from a tuft of grass which I had passed so close to three or four times as almost to brush it with my feet, and my dog as often, without even the slightest suspicion of scent. After reloading, he came up to me, and as he passed at once recognised the bird's hiding-place—thus showing that scent had been diffused by the bird's motion, and although he had neither seen it fly nor fall, went direct to the hedge into which it had fallen, about twenty-five yards distant, and pointed. Again, in a communication I have lately received, the writer says,—"I have seen a dog pass a rabbit on its form without scenting it; I have found the rabbit myself, and seen it crouch itself down closer; and then the dog coming round again has at once pointed it. In that case I supposed the animal by its motion diffused the scent more strongly round it." Again, "I was walking with a pack of beagles which were trying the ground all round me on a fallow field; I found a hare lying; two of the dogs were close to her, and on my giving the usual 'tantara,' one of them stopped and looked up at me, and, in doing so, set his foot upon the hare's back; but, till the hare sprang from her form, had not the slightest idea of where it was. It was rather a frosty morning, but they had previously found and run a hare very well."

Perhaps the grounds afforded in these and similar cases for inferring the presence of an ammoniacal element in scent are quite sufficiently slight—at all events would be if the ground for such inference which we have already noticed did not exist; still we cannot help remarking the appearance of analogy between scent in such cases and the exhalations from a heap of slowly decomposing manure or heating weeds. According to the old proverb, as long as it is left undisturbed little or no smell is emitted; but only stir it, and the *olet* process is not long in beginning.

But further, when the animal moves the scent is not only given off or emitted, but remains, for a variable length of time, upon or about its track. It must, of course, remain thus, either from being suspended in the atmosphere, or from being, so to speak, affixed to the material objects closely passed by the animal as it moved on.

That it is occasionally suspended—and considering the nature of the medium of suspension, for a lengthened period—in the atmosphere, is certain; and on this fact are founded such expressions in connection with scent as "breast-high." The floating molecules—if molecules there be—of effluvium strike the olfactory membranes of the dog (or other animal concerned) at a considerable distance from the animal emitting it, and while he is ranging with his head high above the surface of the earth. I avail myself once more of the communication from which I have before quoted. "I have viewed a fox away from cover, and when the hounds have come to my halloo they have taken up the scent and gone off at full cry more than a hundred yards before they came to the actual track of the fox." The same fact is at the bottom of the extreme caution requisite on the part of the sportsman in stalking deer in Scotland, or any of the numerous game animals in other quarters of the globe, not to "give them his wind;" in other words, not to place himself even for a moment in such a position relatively to them and the direction of the wind, that his scent may be wafted in the currents of the latter within reach of their olfactory organs.* And exactly similar facts are presented to the observation of the shooter in every good scenting day during the season in connection with the usual objects of his pursuit—partridges, pheasants and grouse.

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* I have sometimes purposely concealed myself when my dog was in a distant part of the field I was walking in. He might not miss me immediately, but as soon as he did he made for the point at which he last saw me. If before he reached that point he "crossed my wind" he invariably came directly to my hiding-place; if, on the other hand, the wind lay from him to me, he took up the scent of my steps and hunted me to my concealment.

But independently of such cases as these in which a dog "winds" a covey, or possibly a single bird only, from a distance of two or three hundred yards, I have seen dogs continually, and my own dog fifty times during the last season, on coming across the scent of a wounded bird, which was not the least disabled for running and had got a great start while I was loading, set off at great speed; oftentimes never checking for a moment, and never appearing to make the slightest effort after the scent; and invariably go as direct to the bird (which he had never even seen in some cases) as if he was running "at gaze" all the time; while at other times, and not rarely, he had to work every foot of the track, and it was only with pains and patience and at a slow pace that he brought his quest to a successful issue. In the former case, the scent was not only "strong," but it was a "good scenting day;" that is, the atmosphere was in the most favorable condition for holding the scent suspended: in the latter case, just the reverse.

And how much the state of the atmosphere has to do with it any one may easily observe for himself by contrasting his perception of the odour from a bean field or clover field in blossom in the middle of a fine, dry, sunny day, and in the evening of the same day not long after sunset when the atmosphere is more than comparatively moist. The same, too, of a dunghill or "middenstead" at different times: to-day you may pass it with scarcely any nasal intimation of its presence; to-morrow your olfactory nerves will give you ample testimony of the abundance of ammonia evolved.* The hygrometer, would, if appealed to, doubtless give a very distinct and intelligible "Because" to your "Why."

Besides, what certainly ought not to be, but often is overlooked, in speaking on the subject of scent, the state of the atmosphere almost certainly, I believe unquestionably, has an influence of another kind in addition to that just named, upon if not the perceptibleness yet the perception of scent; I mean that which it exercises upon the organs engaged in the detection or recognition of scent. Thus, in speaking of what may be called the mechanism of smell, we find an able anatomical writer expressing himself as follows: "The matters of odour must in all cases be dissolved (or suspended) in the mucus of the mucous membrane before they can be immediately applied to or affect the olfactory nerves. Therefore, a condition necessary for the perception of odours, is that the mucous membrane of the nasal cavity be *moist*. When the Schneiderian membrane is dry the sense of smell is lost. In the first stage of catarrh, when the secretion of mucus within the nostrils is lessened, the faculty of perceiving odours is either lost or made very imperfect." And it is not the least improbable, but rather the contrary, that that state of atmosphere which renders the material objects that are the ordinary recipients of scent less fitted than usual for receiving or retaining it, may simultaneously affect the usual power of the olfactory organs for its recognition.

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* I have frequently observed this very sensible increase of the "perfume" from a dung-hill on a frosty evening, though frost is generally held to destroy scent. But the following morning has usually in such cases explained the matter, by displaying a copious deposition of hoar frost. In what is called a black frost the most offensive compost heap does not greatly offend the nostril: no wonder then that there is very slight testimony, even if any, afforded by scent in very frosty weather, as to the path of any given animal.

I am led, however, to think there may be reason for the expression "strong scent," though less perhaps than they who use it suppose, except in such cases as those above adverted to of animals hard pressed in the chase; at least, if somewhat modified in meaning. The power or pungency of the emanation probably varies with the physical condition of the creature emitting it, and certainly with the emotional condition. "The secreting action of the skin is influenced by general conditions of the vascular and nervous systems, which are, as yet, ill-understood. It is quite certain, however, that through the influence of the latter, the secretion may be excited or suspended; this is seen on the one hand in the state of syncope, and in the effects of depressing emotions, especially fear, and its more aggravated condition, terror." (Hum. Phys. 632). And again: "The odoriferous secretion of the skin, which is much more powerful in some individuals than in others, is increased under the influence of certain mental emotions (as fear or bashfulness), and commonly also by sexual desires." (*Id.* 979).

Any tolerably observant person who exerts himself sufficiently, from time to time, to become a good deal heated, must be well aware that he is much more highly scented by nature at one period than at another; as also, that it is the same with the horse he drives and the dog he trains to be his daily companion or his ally and assistant in his business or sport.

But generally speaking, and omitting instances in which such influences as terror or sexual desire are known to be in operation it would seem to be most probable that the greater apparent variations in the strongness of scent depend not so much upon the creature emitting it, as upon the state of the atmosphere and the conditions of what may be called its recipients—the objects or substances with which the creature in its movements comes into more or less close contact.

Every one must be aware how odours attach themselves, with differing degrees of permanency, to some objects or matters, and seem to leave others almost or entirely untainted. Thus, paper kept in a desk in which a grain or two of musk has been deposited contracts the strong scent of musk so fixedly that it seems almost ineradicable. The same may be said of any object on which the urine of a male cat has been shed; and a woollen article will retain the strong, disagreeable smell for years: a cake or a piece of bread will contract the scent of the wood of the closet in which it has been kept, or of a lemon, or tea, or pickles placed in its vicinity in any close receptacle; and instances of the same kind may be given to any extent. But the sugar kept in the same caddy with the tea contracts no scent; an egg side by side with the lemon contracts, certainly retains, no perceptible scent; the clean, polished silver spoon contracts no scent or flavour, even from musk, which will not give place on exposure for a few moments to the free air. As far as one can venture to generalise with any satisfactory degree of reasonableness, it would seem that porous substances contract scents most readily and retain them most strongly and permanently; but that mere porosity alone is not sufficient; there must be a degree of moisture present in the porous substance as well. Very dry bread or cake contracts much less of the closety scent than do the same substances when fresh and moist; hard biscuits of any sort, so long as they are quite dry,—and few things contract moisture in small quantities more speedily,—take up scarcely any such scent or flavour; sugar, which has no alternative but dryness, none at all; an egg, or ivory, or glass, none. It may be said a glass scent-bottle will retain scent for years after it has become empty; that a wine or spirit bottle long retains the scent and taste of the wine or spirit. No doubt it is so; but it would be hard to show, in the former case, that it was not a residuum of the scent substance itself left in the interior of the bottle by the evaporation of the spirit in which it was originally dissolved or suspended, and that in the latter case, a very similar allegation could not be made with truth. I certainly think it will be found that all substances which easily contract and readily retain foreign odours are more or less porous, and more or less disposed to attract and retain a sensible portion of the moisture of the atmosphere; and that further, it is only when they are in the requisite condition, with respect to moisture, that they either attract or retain scents strongly.* By analogy, therefore, herbage† of various sorts with the earth itself would catch and retain scent from a passing animal, very forcibly, under favorable atmospheric and hygrometric conditions; very feebly under unfavorable conditions of that kind.

And further, I am not inclined to believe that much scent is given off by the foot of the animal, though a portion may be, and be retained by the impressions made by its feet.‡ As will be apparent from statements and deductions made above, the scent probably proceeds from the entire body; and that it depends in any perceptible degree upon the breath of the animal is scarcely probable in any point of view, and is, besides, as it seems to me, negatived by the feeble or scanty, indeed inappreciable, amount of scent which seems to be given off by the perfectly quiescent animal. One reason for thinking that some scent, however small in quantity, is given off by the foot,—while the bulk, under ordinary circumstances, depends greatly on the surrounding herbage for its fixation, if I may so express it,—is that I have often seen a good dog hunt a freshly moved rabbit or hare for a few paces over the snow, evidently taking up the scent from the very recently imprinted footsteps. But no dog can hunt either feathered or four-footed game in the snow, even for ten yards, by the nose, except in so far as has just been mentioned. Probably the causes to which scent seems mainly to be due being in very feeble operation in frosty weather and when the snow lies deep on the ground, but little scent is emitted, and that little finds no absorbent surface to receive it, and may very possibly be destroyed or neutralised by the low temperature of the stratum of the atmosphere which lies in contact with the snowy surface.

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* It is possible colour may have something to do in the matter. It has been remarked that dark cloths retain the effluvia emitted during a *post-mortem* examination more strongly than light. (Hum. Phys. 908).

† By the courtesy of the master of a well-known and excellent pack of fox-hounds, I am enabled to corroborate the results of my own more limited observation by those of his extensive experience. He says: "I have always found scent better on lands where there is herbage of any kind than on fallow lands; a marked difference generally on wheat and on fallow; and that grass land more frequently holds a scent than arable land." In other words, the more herbage, *cæteris paribus*, the better scent. I may also add, on his authority, that however necessary a suitable degree of moisture may be to the existence of "good scent," yet saturation, such as is produced by heavy rain on the night preceding the chase is quite destructive of scent.

‡ It should be borne in mind that the impressions left by a hare on the ground occupy but a very small space and at very considerable intervals. Probably at every spring she covers not less than six feet; I mean, as she runs under ordinary alarm, and not at her topmost speed. It is, therefore, scarcely reasonable to expect an extensive deposition of scent by the foot in the case of the hare, or indeed of any four-footed animal of chase; and in respect of the bird, the smooth, somewhat scaly surface of the foot would seem little likely to leave much scent behind it. Still, it will be seen, I do not dispute that some scent is distributed by the foot, and it is plainly so in the case of man himself. Since this paper was commenced, my old pointer having accompanied my servant part of the way to my church, when the latter turned back, took up the scent left in my footsteps and hunted me to the church-door, where he sat and howled till warned to beat a retreat; and a few days after I saw him hunting the man above named along one of the hard, dry gravel-walks in my garden; the man had passed some few minutes before, and the dog had rather to "puzzle" the scent out for a few yards, and then he went off at speed with his nose close down to the ground. But then the foot of man gives out much and powerful scent, which is, as it were, concentrated by means of the shoe. Again, in addition to instances of the kind just quoted, which are literally innumerable, a dog will hunt his master who has passed along a road on horseback. But in this case, too, he refers to the ground for information, and therefore, I believe, he hunts the horse and not the man. Of course, there is no need to do more than simply state that the dog has no difficulty in distinguishing the scent of his master, or of any of the members of his master's family; and it is notorious that the farmer's dog knows his master's stock by night or by day. Many remarkable instances are on record, in which the shepherd's dog has

I have been told, and it is stated in, I believe, Johnson's 'Shooter's Companion,' that there are some fields or parts of fields where scent invariably fails. A field near Pods Wood, at Layer Marney, in Essex, was mentioned several years since to the gentleman, of whose communications I have already availed myself more than once in this paper, by the master of hounds hunting that country, as one over which the hounds could never carry the scent; and the remark was corroborated on another occasion by a resident in the district, who was in the habit of frequently riding to the hounds when the meet permitted. He said there was no perceptible difference between that field and others, either as to soil or other characteristics. That scent may be cold, and only carried with great difficulty in particular places and on particular occasions, is nothing new or strange.

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been known to pick out the sheep of his master's flock when by any chance they had become intermingled with those of another. And it would be very difficult to prove that the power of smell did not at the least aid in this astonishing achievement. And on other grounds it is not hard to have to admit that the dog hunts the horse rather than the man; for the quadruped is, as a companion, nearly as familiar to him as the biped. Indeed, the mere sight of the saddle or bridle is often the only invitation the dog requires to take part in the projected excursion.

Scarcely a day in the shooting-season, or the record of a single chase of fox or hare, but affords abundant instances of the kind. "Difference in soil," as Daniel says, in his article on hunting, "alters the scent," and "the enclosure of poor lands in heathy countries sometimes renders the scent very difficult for hounds."* But that scent should always fail over one particular field or a part of it, is very remarkable, and, apparently, quite inexplicable. The failure alleged, it should be observed, is totally distinct from failures which often occur in almost any beat in long-continued dry weather. Thus, in one part of a turnip-field where the plant has missed, the surface-soil will be as dry as if baked, to the full depth reached by the horse-hoe; and here no scent will lie after 10 or 11 o'clock on a fine, sunny day. In another part of the same field, however, and close at hand, the scent will be good or strong; because there the turnips have brairded well, and their foliage serves to keep the surface-soil very sensibly damp, even when no rain has fallen for some considerable time past.

Another fact, which seems almost equally remarkable with that just now mentioned, is perhaps much more easily accounted for. "It is a curious fact," says Mr. St. John, "but one which I have often observed, that dogs frequently pass close to the nest of grouse, partridges, or other game, without scenting the hen-bird as she sits upon her eggs. I knew this year of a partridge's nest which was placed close to a narrow foot-path near my house; and although not only my people but all my dogs were constantly passing within a foot and a half of the bird, they never found her out, and she hatched her brood in safety." ('Highland Sports,' 25). Such instances are by no means rare: I knew of a partridge's nest last year on the bank by the side of a much-frequented lane, and another was mentioned in the communication more than once referred to already, in which were seventeen eggs, both of which nests were repeatedly passed by sporting dogs, but never detected or noticed by them. I believe the apparent scentlessness of the bird in such cases must depend on its utter quiescence; and it is not easy, anterior to experience, to realise the perfect immobility with which a partridge will often retain her seat on her nest. Not to mention the repeated instances in which she has been known to sit until the scythe cut her in two, I will only relate an incident of the kind which occurred under my observation last year. I wanted a couple or two of rabbits, and had taken my gun to a wood which clothed the lower part of a somewhat craggy steep: after passing through the wood, I had gone above the crags and walked along the wall, which served rather to keep sheep and cattle from the precipice than as a boundary to the wood. At one point it occurred to me to look over the wall, in case a rabbit might be seen sitting within; I had stood for at least a minute looking down over the wood and the country that lay below in its beauty, when suddenly a partridge rose from under me, striking my leg with its wings as it flew: on looking down without moving my foot, I saw her nest with eleven eggs, and perceived that my shoe must have been in actual contact with the bird. It may be interesting to add—though not very relevant—that I believe she returned to her nest and brought out her young ones safely, as I often saw a covey during the season, corresponding in numbers, in the closest vicinity to the position of the nest.

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* The authority quoted in a former note says: "A marked difference in scent is always apparent in passing over the various strata; and, universally the better the land and the better cultivated, the better the scent. Very poor lands never hold a *good* scent: a gravelly surface is by no means the quality for scent, whatever the subsoil: wet, undrained clay land holds a better scent when thoroughly saturated than in any other state; when perfectly dry, and, it may be, hard, no hound can hold a scent over it."

Moreover, the utter stillness of the sitting bird may be, no doubt, often aided in its efficacy towards preventing detection by the additional circumstance that, from its situation, the nest, and with it its occupant, is often more or less elevated above the common level of the ground near it. I have often been struck by the fact that scent rarely seems to descend. It may and often does rise (sometimes to the height of four or five feet, and how much higher it is impossible to say; probably, under favorable circumstances, it continues to ascend, until by continued dilution with the atmospheric air it ceases to have any distinct or recognisable existence; but rise to a certain height it does), for I have seen my own pointer find and point game from the summit of a heap of stones laid against a five-feet wall, forming one side of a narrow lane; and other analogous cases might be adduced if it were necessary. But if a bird falls into a hedge or low tree, and rests some four or five feet from the ground, it is but rarely that the best-nosed dog obtains any intimation of the position of the game, although he may pass and repass precisely under it. I have, once or twice, under such circumstances, seen a pointer stop as if attracted by a slight taint of scent, and once have seen him rise up on his hind legs, as if under the impression that the game was above him; and my correspondent records a similar circumstance. On the other hand, on "the first" of last September I shot at a bird which I had marked after wounding it at a previous discharge: it fell about fifty or sixty yards from me into a thick hedge, at about four feet above the ground. My idea was that it had not fallen dead and would run: my dog, to whose point I had killed it, saw it fall as well as myself, and on my advancing after I had recharged, hastened directly to the spot; I had marked it to within a foot, but no scent could be obtained on either side of the fence, and though I looked into the part upon which it had fallen I could not see it. At last, on looking through the hedge from the other side, I saw a dark object suspended, which proved to be the partridge, quite dead. And again, much later in the season, I brought down two at one shot; one fell into a hedge not far distant, dead, and hung suspended by a leg; the other which fell to the shot proved to be shot in the head, but not disabled, and, on the approach of the dog, took wing again and flew in the wild, bewildered way, mentioned in my article on the partridge (Zool. 6012), though not to a great distance. After securing the latter I turned to bag the other; my dog passed close underneath it, caught, as it seemed, a slight, uncertain whiff of scent — for he paused for a moment—but being unable to make anything further of it, went on again. If he had only looked up, the bird hung plainly visible, and within reach if he had simply raised himself upon his hind legs.

I have now only to notice the period of duration in scent; and here again, I am much indebted to the kind courtesy of the sportsman above referred to: "The duration of scent," he says, "appears to depend mainly on the animals pursued; for instance, the scent of the fox may be run *hard* after a lapse of ten minutes; whereas, that of the "foumart" after fifteen or twenty hours. But it must be remembered, that the work of the foumart is during the night, and consequently would come under the head of "drag;" as of the fox, "on trail;" as of the hare, which can be owned after the above period: not so when found and pursued during the day, as, say, half-an-hour would stay proceedings altogether." This statement is a very interesting one: any one who has observed the tracks left by the hare, the rabbit, the fox, the stoat, the foulmart, in their movements during the night, must have been struck by the evidences afforded by the tracks of deliberateness of motion on the part of the animal traced. It is at once apparent, that every few yards the creature paused: in the case of the rabbit or hare, a single pellet or two of dung and, possibly, a few drops of urine may be seen in a great number of places: the fox seems to have moved in a devious sort of way, but never at a greater pace than a fast walk or gentle trot, and much the same is true of the stoat or foulmart: the latter animals, too, as well as the hare and, the rabbit void their excrement and urine at night. Deliberate motion then, the processes of defecation often interrupted, as often renewed, the favorable hygrometric conditions of the nocturnal atmosphere, all of them circumstances, as we have seen, tending to produce and to conserve a strong scent, in accordance with the principles we have endeavoured to set forth and illustrate in the former portion of our paper, are all concomitants of the deposition of the most permanent "scents" we have any knowledge of. The principal "waste" of the system takes place, under ordinary circumstances, during the night in all animals whose habits are nocturnal. This is one important source of scent, and in the most favorable form of operation during their night-long rambles. Another is in a measure dependent on the emission of their fæces, liquid and solid; this, too, is in operation: while the effect of both, and of what may be called the permanent fætor of their skins or fur, is raised to its greatest pitch by the deliberate character of their movements, which at the same time allows the greatest possible quantity of the scent matters to be attracted, and, in a sense, fixed by all the suitable substances in the vicinity of which the animal passes.

I think I have now noticed all the facts and conclusions which have, at different times, presented themselves to my regard when thinking about the nature and peculiarities of scent. In conclusion, I shall only briefly observe, that in whatever degree the statements above made on the authority of eminent physiological writers are admitted to be well founded and in accordance with fact, in the same degree is the weakness of the Retention Theory displayed and itself shown to be untenable. The animal, whether feathered or four-footed, which under the influence of its emotions—terror being one of them—is irresistibly constrained to give out more than usual of its peculiar or natural odour, can under no circumstances be supposed capable of repressing or preventing the emanation of that odour, and least of all when acted upon by fear or apprehension, if not downright terror. And further, if our conclusions as to the compound nature of scent, so far, that is, as its origin and its elements or constituents are involved, are admitted to be reasonable and just, the utter impossibility, on physical grounds, of voluntary retention by any animal of its natural scent is established. All substances partaking of the nature or properties of either musk or ammonia must be, if present on any part of an animal's skin or coat, and exposed to any diffusing agency, liable to betray themselves, whether the animal wishes it or not, to the first passer by possessing suitable olfactory powers. The only control it can have over them depends upon its perfect immobility, as by that course it is saved from putting the air immediately surrounding it and most impregnated with its scent into motion; and so from diffusing the odorous particles or vapours through a wider extent of the suspensory medium. With this remark I close the present paper.

J. C. ATKINSON.

Danby Parsonage, Grosmont, York,
March, 1858.

White Thrushes, Blackbirds, &c. — In a former number of the 'Zoologist' I sent you a paper on the transmission of colour by white and pied pheasants, wherein I stated the great numbers here which had been bred originally from one white cock pheasant; and I now venture to trouble you with a further communication as to the vagaries of Nature at the same place, with reference to the colours of other birds and animals. First as to thrushes: — Last year two white specimens were found in the neighbouring parish by a boy, who has brought up one of them, which is now alive, sings, and is doing well; the other was taken out of a different nest, and I believe is since dead. This year, within about half-a-mile of where the former birds were taken, in some very secluded ornamental walks down a rocky dell or dingle, with a series of pools occupying the bottom of it, a blackbird's nest was found, and unfortunately taken; one at least of its young inhabitants was captured, which proved to be completely white; another, which luckily escaped, was quite grey or pied, and nearly the colour of a young cuckoo. These varieties in blackbirds are not very uncommon occurrences in different parts of the kingdom, but those of the thrushes are, I believe, very unusual. My next variety was in a young rook. When the young rooks are strong enough to leave their nests, a great onslaught upon them takes place here for a few days by the butler and groom, to keep them within a reasonable quantity; and at a neighbouring rookery, a few hundred yards distance, on another gentleman's property, some young friends told me the other day they had that morning killed between eighty and ninety young rooks; but notwithstanding this havoc some considerable number of the young rooks get away, and amongst others who came here for safety, I saw one, the whole of which, excepting the wings and head (which were black), was of a dun colour, and as nearly as possible had the appearance of a hooded or royston crow (as it is often called); but it was unquestionably a young rook, and in company with several old ones. The fourth example of an unusual colour are rabbits, which in this dry and heathy soil are so prolific that a rabbit-catcher is obliged to be kept on purpose to keep them down, or the outcry of the farmers would be quite unbearable. This man is accustomed to catch in the course of the year many hundred couples of rabbits on this property and on the adjoining farms, and he states that he very seldom meets with any but the usual-coloured rabbits; sometimes he has met with a black one. Last year I saw an old rabbit near the house completely yellow or light straw-coloured; afterwards three young ones made their appearance; these were not killed until towards the month of June, when the old one and two of the others were destroyed, and the remaining young one disappeared from where it had been before seen, though the other rabbits of the usual colour still remained at the same spot. This year, in the month of April, at some considerable distance from where the yellow rabbits before mentioned had their burrow and used to reside, two or three very small completely yellow rabbits were seen sitting at the mouth of the same hole, in company with several of the common-coloured gray rabbits, apparently of the same size and age as the former; but no old one of that colour was anywhere to be seen, which must have been the case had there been any such about. Since the month of April these yellow rabbits have increased in numbers from three to eight or ten at the same spot; they are of different broods and sizes, and cannot be the offspring of the young yellow ones. In addition to these, four or five yellow ones have also appeared at other places quite distinct from the former, in a cover preserved for the game, where there are a great number of the common ones; one or two more have also occurred elsewhere; so that altogether there must now be from fifteen to twenty of these strange-looking rabbits amongst the others, and the latter are not the least alarmed at their difference of colour. I am at a loss how to account for so many of these yellow rabbits springing up, as it were, all at once in so many neighbouring places. Amongst them all in no instance has an old one of that colour been seen. Although rabbits will at night travel a good way for food or to consort with their friends, it is very seldom, when food is at hand and their burrows near, that they will go any considerable distance from home. The spot where the old yellow rabbit and her three young ones were first noticed is not the place where the present numbers of that colour are now to be seen, though it is no great distance from it. What is the cause of this sudden increase in the number of these yellow rabbits? Another somewhat unusual variety very common here is in the squirrel, of which there are numbers about with tails completely straw-colour, as well as many of the usual colour. Of the white and pied pheasants before alluded to I have many still about, and every year several broods of young pheasants may be seen, some consisting of the variegated specimens and others of the common colours. I may also add that a poor old mole-catcher who is employed here states that many years ago he caught a nearly white or very light dun-colour mole, for which he got a guinea.—*W. H. Slaney; Hatton Hall, June*, 1858.

Hooded Crows at Flambro' Head.—Being engaged in collecting Diatomaceæ under the cliffs at Flambro' Head, on the 6th of June, I noticed a pair of Corvus cornix (here called Norway crows) flying about the face of the cliffs, where no doubt they had a nest. This surprised me not a little, for, hitherto, I had considered the Scotch Highlands—where I have noticed them in immense numbers—to be their usual southerly summer habitat. On referring, however, to Yarrell, I find I have been labouring under a wrong impression, and that Corvus cornix has been noticed to breed even so far south as Norfolk, and that this is by no means unusual at Scarbro': still I deem the fact of their occurrence at Flambro' worth recording. — *G. Norman; Hull, June* 19, 1858.

Occurrence of the Bee-eater at Kingsbridge, Devon.—I have just received from a friend a male specimen of the bee-eater (*Merops apiaster*), which he had shot in a newly ploughed field, apparently searching for insects, the remains of which I find its stomach to contain.—*Henry Nichols, Jun.; Kingsbridge, Devon, May* 22, 1858.

Hawfinch Building at Tonbridge.—A pair of hawfinches have built their nest this year in an orchard in the vicinity of Tonbridge; but, unfortunately, the nest has become a prey to a prying school-boy, who took the first egg and substituted in its place a small blackbird's egg. The next morning another egg was laid, but the blackbird's was gone: the birds were then again robbed of their egg, and have in consequence deserted. Their nest, however, has not been built entirely in vain, for a pair of house-sparrows, seeing it deserted, are now constructing their clumsy domicile on the top of it.—*T. W. Greene; Tonbridge.*

The Small Partridge.—In answer to the communication from the Rev. J. C. Atkinson in the June number of the 'Zoologist,' (Zool. 6095), in which he asks me to explain a discrepancy in my account of a small partridge shot on the heaths in this neighbourhood, and that of Mr. Kidd who had shot them on Hindhead and its neighbourhood, I can only repeat that I certainly have never remarked any difference in plumage between the heath birds shot by me and the stubble-fed birds; there may be a slight difference, but in the instances I have seen it is not worth mentioning. Fowley is not far from Hindhead, and it is the same line of heath from where I have shot these birds to Hindhead, the latter being the very much higher ground. My locality is Woolmer Forest, a large tract of waste land of many thousand acres, and which adjoins the Fowley estate, which is also surrounded by heath land; but I have also shot these heath birds in the neighbourhood of Ash and Aldershott, which is a continuation of the same line of wild heath country, but, except in the smallness of size and the absence of corn in their crops, which contained heather only, I confess I could never find any appreciable difference between them and the common partridge. I have before me the letter of a friend, an excellent sportsman and naturalist, who resides not many miles from Godalming, though on the opposite side from Hindhead, who, after having read the articles in the 'Zoologist,' writes to me as follows, throwing quite a different light upon the "little black heath-birds" of his country, and those of Mr. Kidd's description. He says: "I presume these are the same that I had up to about ten years ago on my heaths: they never went into enclosures; were black inside from living on hurts and heath. In one instance, they were thrown away by a cook, as being unwholesome, from finding when she drew them that they were quite black, and I used to send a brace of them, as I should of grouse, they were so high-flavoured: there was no particular difference in their plumage; they were a turn smaller in size and darker in colour, but not sufficiently of either but that they might have passed muster as ordinary partridges, if attention had not been drawn to them; the only remarkable part about them were their legs, which were always bluer than the common." I can only say, in reference to this, that I have always put my birds, when killed, indiscriminately into the bag with others, and have never remarked the difference of the colour of the flesh, if there is any in our heath-birds here; neither have I noticed the blueness of the legs, as mentioned in my friend's letter, but in his county the hurtle-berry abounds even more than it does on Hindhead, and this most probably influences the colour in the flesh of these birds.

However, the conclusion I draw is that the heath-birds found in all these different localities are the same partridge as the common, rather stunted in growth, like our forest-bred ponies, and their flesh and their plumage, in Mr. Kidd's birds, altered by their food, namely, heather and hurtle-berries, of which latter in all this county, there are vast quantities; and I once shot a hen-pheasant in the latter end of August, having mistaken her, when flying from me in the sun, for a grey hen (as we were black grouse shooting at the time), and her crop was one entire mass of these purple berries. This proves nothing, but the fondness of game-birds for that particular food. The extreme blueness of the legs, as mentioned in the letter I quote, if observable in all these localities, added to the difference in size, which is acknowledged by all, would certainly tend to prove a variety, as the colour of the legs would be less likely to be influenced by the food; and if I shoot any this year, I shall particularly remark this, to compare them with others, but at present I hold the supposed "mountain partridge" of the 'Field,' to be a myth.—*John W. G. Spicer; Fowley, near Liphook, Hants, June* 11, 1858.

Note on a Lapwing's Egg with Two Yolks.—I observed this morning in a dish of lapwings' eggs one nearly twice the usual size, and on opening it, I found that it contained two perfect yolks; although this is not an uncommon phenomenon in the eggs of domestic poultry, I never met with it before in the egg of a wild bird. Possibly, the circumstance of lapwing's eggs being so frequently abstracted from the nest in consequence of the demand for them at the table, may in some measure account for the occurrence of such an irregularity in an egg of this species.—*J. H. Gurney; Kensington, May* 24, 1858.

Domestic Ducks Nesting in a Church Tower.—Some days ago two ducks were seen on the weathercock of our church, which seemed strange, but the strangest part of the story is to be told. On the morning of the 1st instant the son of the clerk had an occasion to go up among the bells, where, to his surprise, he found the ducks had a nest with eggs in it, and this morning (June 3rd) I examined the nest; in it there are eight eggs. The elevation of the nest from the surface is some ninety feet. The ducks are the property of T. M. Boorn, Esq., who is anxious to preserve the eggs so that the young may be hatched where the eggs are at present.—*Sussex Express, June* 5, 1858. [*Communicated by the Rev. Arthur Hussey, Rottingdean*].

Occurrence of the Short Sun-fish at Torquay.—The short sun-fish (*Orthagoriscus mola*, Schneider) is a fish of sufficient rarity to make its capture worth noting, while its form is so *bizarre* and its size so great as to make it a sort of wonderment among sailors and fishermen, who invariably drag it about from house to house as a raree-show when they secure one, in the hope of a few pence. Thrice in this manner has the species been brought under my notice; at Ilfracombe, in the summer of 1852; at Tenby, in 1856; and to-day at Torquay. This last specimen is smaller than the former ones I had seen; as it is not more than about two feet in length, and a foot and a half in height; its colour, too, is a lighter tinge,—a silvery gray, becoming white on the belly, and scarcely deepening to an iron-gray, even on the back. I looked in vain for the curious disk-shaped parasitic leech,—Tristoma molæ; which is often found on the species, and which, I remember, was infesting in some numbers the

Ilfracombe specimen. This individual was captured in a mackerel seine, off Hope's Nose, near Torquay, about the middle of the day of the 15th of June instant.—*P. H. Gosse; Sandhurst, Torquay, June* 17, 1858.

Colias Edusa, Macroglossa Fuciformis and M. Bombyliformis at Winchester.—Having the day before yesterday (June 8th) captured a Clouded yellow, I thought that an event so unusual might be worthy of insertion in the 'Zoologist.' It was a fine female, evidently just out from the chrysalis, as the spaces between the nervures were in that limp condition which is observable in insects before they have become stiff by flight. The specimen was seen alive by at least ten persons. On the same day I had the good fortune to capture a specimen of Melitæa cinxia, one of Macroglossa Fuciformis, three of M. Bombyliformis and other good things. The two Macroglossæ seem very partial to the red campion (*Lychnis dioica*), for I took them all while hovering over the flowers of that plant. The neighbourhood of Winchester is, I have every reason to believe, rich in Lepidoptera. Of the sixty-five Rhopalocera, I have myself taken forty-six species, and know of others having been taken.—*J. S. Wesley; The Close, Winchester, June* 10, 1858.

[The two British Colias have occurred repeatedly in the neighbourhood of London during the past May and the present June: I believe them all to have hybernated.—*Ed.*]

Correction of an error.—I regret the readers of the 'Zoologist' should have been misled by my giving Thecla Pruni as a native of South Wales, it should have been T. Rubi (see Zool. 6100). I may also remark, I have no claim to the title of "Reverend."—*Robert Drane; Cardiff, June* 22, 1858.

Occurrence of Clostera curtula in the Isle of Wight.—A few days ago I was informed by a friend, who, though an F.G.S., &c., is not versed in insect lore, that a very curious object—a skin of a moth—was attached to the wall of his house. Not thinking it very probable that the sudden hot weather had induced a moth to throw off his outer garment, but expecting to find it was the skin of a caterpillar, I went to the spot and found it was a good specimen of Clostera curtula. Seeing it indicated in the 'Manual' as scarce, and observing it is not mentioned in a local list, published a few years since, I forward the capture in case it is thought worth recording, not being myself a Lepidopterist. It is now in the collection of a friend.—*G. Guyon; Ventnor, Isle of Wight, May* 31, 1858.

Bankia Bankiana.—I have met with this hitherto rare little Noctua in considerable numbers. It is extremely local, confined, so far as I have observed, to one little patch of bog on the mountain side. It flies heavily towards afternoon, but only for a few yards at once, settling on the stems of grass, after the fashion of a Crambus, and is easily captured.—*Edwin Birchall; Killarney, June* 19, 1858.—*From the 'Intelligencer.'*

The Larva of Xanthia Aurago.—The larva of this pretty Noctua is now feeding on the beech and the maple; but, as it seems, according to Guenée, to be but little known, and is inaccurately described by Treitschke in Mr. Stainton's 'Manual,' I have thought it might interest some of the readers to know what it is like, and how to find it. The egg, which is ribbed and at first pink, but changes after a few days to a slate-colour, is laid in the autumn, on the buds and small shoots of the beech and maple. It hatches about the 20th of April, and first attacks the opening bud, in which it buries itself. The larva is naked, of a reddish brown, with a narrow white dorsal line, and two narrow white spiracular lines: head, six front legs, and spiracles black. After feeding on the opening bud, it then unites two leaves together and feeds and moults between them. As it attaches the leaves pretty firmly together, it seems of little use beating for it, but it may be found by raising the branch and holding it against the light, when it is easily observed between the leaves.—*Rev. B. H. Birks; Stonor, Henley-on-Thames, May* 22, 1858.—*Id.*

Capture of Camptogramma gemmata and fluviata at light, near London.—On the evening of the 5th of June, I took both these species at gas lamps in this neighbourhood, two specimens of the former and one of the latter. I have presented one of the gemmata to the cabinet of the Entomological Club.—*John Henry Tilly;* 3, *Bernard Street, Regent's Park, June* 15, 1858.

Elachista Trapeziella: its Food and Transformations.—Larva deep pink (in some individuals much darker than others, and this may be a sexual difference), with a yellowish line down the back and sides. Mandibles pitchy black. Corselet with a pitchy patch, divided by the dorsal line, in each half of which is a blackish spot. It feeds on Luzula, and the egg is apparently laid at the base of the leaf, as the larva enters from thence mining upwards and making a track so fine as to be almost imperceptible without the aid of a magnifying glass. After it has thus worked for a considerable distance it suddenly makes a broader mine and returns downwards parallel to the first track, when its operations may now be detected. The broad mine is of a dirty grayish colour, and seldom exceeds a sixteenth of an inch in width. Here I may add, that probably those who were not fortunate enough to detect it, searched on the fresh leaves. From what has come under my own notice it is only to be met with on those leaves which have assumed a purplish tinge. No doubt the egg is deposited on the young leaf, but before this is hatched, age, and other causes too sometimes, act upon it as above. Decidedly the most difficult larva to find in the whole Elachista group. When about to change to a pupa it quits the mine, and, retiring to a convenient place, it then makes a slight spinning, to which it attaches itself, as well as by a few threads thrown across its back. The pupa at first, and until near the perfection of the imago, retains a good deal of the colour of the larva. It is rather narrow, and with the dorsal ridge acute and pale. In all my examples the pupa was suspended head downwards. This is a fine species resembling none of the others in the position of its markings except E. cinereo-punctella; and from this it is at once separated by the deeper colour of the wings and the short silvery white streak running along the fold at the base of the wing. Mr. Stainton's description in the 'Insecta Britannica,' p. 254, is exceedingly good. After emerging from the chrysalis, and when the wings have been developed, they are suddenly raised to an angle forking about 90 degrees with the body, and with their superior surfaces turned to each other so as to be almost touching it, thus stand until they are fit for use. The larvæ are nearly all full grown by the end of April, and the perfect insect appears at the end of May or beginning of June.—*John Scott, Southfield Villas, Middlesbro'-on-Tees, June* 14, 1858.

Scolytus supposed to attack only unhealthy Trees: Cossus ligniperda does infest the Elm.—In the last number of the 'Zoologist,' I observe a paper, from you, which I was very glad to see, in reference to the article by Captain Cox on Scolytus destructor and Cossus ligniperda. Now, as regards the latter feeding in elms, I had an instance of this lately brought before me: the Rev. J. Hillens was pupa digging this spring, and came to an elm that was greatly damaged by the boring of a whole brood of larvæ of the Cossus, eighteen in number, or rather this is the number that gentleman brought home with him, some of which he gave to me: thus it will be seen that Captain Cox is right so far as the Cossus will feed in elm timber; but, as you observe Zeuzera Æsculi might have been mistaken for it if the larvæ were not seen, and as the larvæ of the latter are so common in the parks and even in the squares of London, it is very probable to have been that species. Now, as regards the Scolytus destructor, I disagree with Captain Cox in saying the insect attacks healthy trees; for my part I do not believe it does so. In the neighbourhood of Exeter and in Devonshire generally, the elm is the most common tree we have, indeed it is the principal arborescent vegetation of the county; and you may hunt a hundred, nay a thousand, healthy trees and you will not find a single instance of the Scolytus; but if a tree is diseased so as to cause a stagnation in the sap in any part of the trunk or large limbs, but more particularly the former, it is near to this you will find the larvæ of the Scolytus in plenty feeding on the liber and cambium, as also the softer portions of the wood immediately beneath: it is on the mucilaginous sweet sap that the larvæ appear to subsist; and where disease has taken place either from a wound, or the decay of a branch so as to admit water and the weather to act directly on the young and delicate wood forming liber, the cells become ruptured and broken down; the consequence is, the portions of the inner bark become so gorged with sap, that it oozes out and becomes a weeping wound; and it is round about such wounds you find the larvæ of this insect feeding on this gorged portion of the liber, which is very sweet to the taste: like most other insects they appear to like saccharine fluids. Now, to prove that the insects prefer the stagnant sap to that of an healthy tree, I will instance a great number of elms that are cut down for timber and brought into the basin yard, near the quay and the steam saw-mills; in the bark of several that were cut down in the winter and early spring of 1856—so that they laid in the yard through last summer—and as I was hunting over the trees in this yard for Coleoptera in March and April of this year, and in ripping off the bark of the elms I discovered it was full of larvæ—they literally swarmed with Scolytus larvæ; indeed, they were so numerous that I was doubtful if it was that species. Well, I left them for some time until I thought they would have arrived at the pupa state, but when I returned to the trees again I found them all stripped of their bark by the poor people from the city, who steal it to burn. I was much vexed to think I could not follow up my observations: I hunted round the trees and found a piece of bark round a small knot, about the size of my hand; when taken off I saw several pupæ. I took this piece home and placed it in a breeding-cage, and, about a fortnight ago, five perfect Scolytus emerged from this little bit of bark; this I was much pleased to see, as it bore out my supposition. Now I can positively assert that all the trees that I examined in the first instance before the bark was removed were as full of larvæ as this small bit I took home with me, and, if they had remained untouched, would have produced thousands of the Scolytus, and these insects would have emerged just in time to deposit their eggs in the bark of the newly brought-in trees which have been cut down this last winter and spring; and here I may observe is the place to examine if the timber be sound and good, which I can assure you it is; so that it is the stagnant sap that attracts the insects, not the trees (as may be said are in a semi-decaying state from being cut down), now why should we find these trees swarming with the Scolytus larvæ when there are hundreds of fine healthy trees in the adjoining fields? even two sides of the basin yard are studded with elms, but you cannot find them attacked by the insect: why, I say, do we not find them? why, because it is not their proper or natural food: it is only in those portions where disease has begun its work, and the insects are attracted to the diseased portions, like most other lignivorous species to hasten on decay, which appears to be their office, and that they carry out to the letter.—*Edward Parfitt; 4, Weirfield Place, St. Leonard's, Exeter.*

Scolytus supposed a secondary cause of injury: Cossus ligniperda does infest the Elm.—In your paper read at the Entomological Society upon Scolytus destructor, the inference you point out is certainly the correct one, viz., that the trees were not suffering from Scolytus so much as from Cossus. But my reason for writing to you is to inform you of the fact that the larvæ of Cossus ligniperda does infest the elm, so much so, that the greater number of valuable trees in Mount Edgecumbe Park are nearly destroyed through the perforations of this larva: at least I suppose the larvæ to be the cause, but I cannot give positive proof, not knowing whether they were diseased previously, and not having tried to cure them. Cossus larvæ do not always mine to the centre or interior of a tree, but are to be seen in the full-grown state lying in their trenches on the surface of the wood, just under the bark. The last four larvæ I took were in the situation I describe. Passing by a tree I saw a patch of the bark loose, and guessing the cause, I returned, took off the bark, and two great fat fellows were exposed to view; two more were another skin deeper. I have not met with Scolytus destructor here; I took one specimen at Exeter last year: our equivalent is Hylesinus crenatus.—*J. J. Reading; 11, Ham Street, Plymouth.*

[A number of letters have been received, the writers of which take the views indicated by Mr. Parfitt and myself, that Scolytus destructor attacks only the injured or dying trees, but I think Captain Cox is entitled to be heard in reply before anything further is published on the opposite side of the question. In the present state of the question I do not wish to enforce any opinion of my own.—*Ed.*]

Beetles in Ants' Nests.—The attention of English Coleopterists has of late been more than usually directed to the search for the beetles usually found in ants' nests, and the result has been that several species have been added to our native lists. This year I have devoted some time to the subject, with a view not only of obtaining specimens, but also of trying to discover what it was that induced the beetles to be dwellers in habitations they had not assisted to build, and where, judging *a priori* from the carnivorous habits of the proper inhabitants, they would be likely to lead very uncomfortable lives. My observations have been exclusively confined to the nests of the large wood-ant (*Formica rufa*), and, as far as I have been able to notice, the beetles live in perfect harmony with the ants, neither attacking them nor being molested by them. I have proved also by keeping the various species together in a bottle for several days, that these beetles do not hurt each other. I should also mention that the nests are full of Onisci of different sizes and colours, and possibly of different species, but they and the ants do not quarrel in the least. The sight of these Onisci led me to think that they were there, as in other places, on account of the presence of moisture or decay which favour their existence, that they were not tenants at the will of the ants, but lodged in their nests rather in spite of them. This hypothesis did not seem very easy of demonstration, but luckily I stumbled on that which threw a light on the matter. I found an ants' nest which for some cause or other had been deserted since last year at least; it was a large heap, as much as a cart-load, quite intact, like the other ants' nests full of Onisci, Iuli, Scolopendræ and Acari, but without a single ant living in it. I took a portion from the top, spread it out on a sheet of white paper in the same manner as I had done from the nests that were full of ants, and soon had the pleasure of seeing some beetles moving among the *débris*. I repeated the process, and eventually found I had the following species, the relative numbers of each being about the same as in the other nests, except that Saprinus piceus was much more numerous:—Dendrophilus pygmæus, Saprinus piceus, Monotoma angusticollis, M. conicicollis, Trichopteryx sericans, T. atomaria, Cephennium thoracicus, Leptacinus Formicetorum, Thiasophila angulata, Oxypoda hæmorrhoa, O. formicetorum, Quedius brevis. There were also many beetle larvæ moving about. It was therefore not only clear that that the Onisci were in no way dependent upon the ants, but that those beetles I have mentioned, which are usually found in nests of Formica rufa, have no necessary connection with the ants, but merely take advantage of the circumstances favourable to their existence, which are incidental to the nests, such as the decaying wood and vegetable matter, the heat which is considerably greater than that of the atmosphere, and the Acari and other small creatures which abound. The xylophagous beetles, I have no doubt, feed on the wood, the carnivorous on the Acari, &c., which are fostered by the heat. It is certainly curious that certain species of ants have for lodgers only certain species of beetles; it has been surmised that the formic acid of the ants has an attraction for most of the beetles, and it may be so, but I am inclined to the opinion that investigation will show that in many cases where a direct connection with the ants is now supposed to exist, it is merely some contingent circumstance that causes the beetles to frequent the ants' nests. While we cannot disbelieve the statement of Müller and others that Claviger foveolatus secretes a fluid which is eagerly taken by Formica flava, in whose nests this beetle is found, and that the ants in return feed the beetles from their own mouths and carry them out of the way of danger, yet it is possible that there has been some error of observation, for similar statements have been made with regard to the Paussidæ found in ants' nests, and yet the facts have been deemed susceptible of very different interpretations. Herr Gueinzius, writing about the Paussidæ of Port Natal, says (Proceed. Ent. Soc. 1851, p. 106), "I saw a long train of ants busily running backwards and forwards, and I remarked among them a Pentaplatarthrus gently led by its antennæ by several ants, which accompanied it in the common procession. My first idea, that it was forcibly held against its will, I gave up, when on this and following days I several times saw the same fact occur on the approach of a thunderstorm." But Mr. Plant, also writing from Port Natal, says of the Paussidæ (Proceed. Ent. Soc. 1855, p. 121), "Respecting their habits, I think the notion that they live with the ants, or are at all desirous of their society, is an error: all that I saw were close prisoners and jealously guarded. The beetles are in the bottom of the tufts of grass, and owing to the small size and matted nature of the herbage, are very difficult to discover in that position, but it is the business of the ants to find them, and well they perform it. The ants do not kill them on the spot simply because they can convey them home alive. * * * The sum of my observations amounts to this:—the Paussi do not seek the ants nor remain with them voluntarily; on the contrary, they use every possible exertion to escape, though not one that I saw succeeded in doing so, they are captives to the ants; and for what other purpose should the latter toil in their capture, but in the pursuit of their natural instinct to secure food wherever it is offered." I quote these remarks to show how differently the same circumstance may be estimated, and that although it is possible Müller is right about the Claviger, it by no means follows that all beetles found in ants' nests are in any way connected with the ant. It is, no doubt, very singular that such voracious creatures as the ants allow so many aliens to live among them unmolested, but though apparently ready to eat any living thing, may they not, like other animals, have their likings and dislikings? In some instances, especially where the resemblance of the beetles to the ants is very great, it will probably be found that the beetles frequent the ants' nest to eat the ants, but it is not likely that any beetles which the ants will devour are voluntarily in their company.—*J. W. Douglas; Kingswood Place, Lee, June*, 1858.

Cossonus linearis.—Remarking the supposition that this insect had not probably occurred for twenty years prior to its discovery by Mr. Janson, the place of capture being one of the arcana of science; I beg to state that I met with it in the course of last summer sunning itself on the tops of palings, near the railway-station, Upper Norwood.—*Alfred Haward; Gloucester Road, Croydon, June* 22, 1858.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

June 7, 1858.—J. O. WESTWOOD, Esq., V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—'First and Second Report on the Noxious, Beneficial and other Insects of the State of New York, made to the State Agricultural Society, pursuant to an appropriation for this purpose from the Legislature of the State,' by Asa Fitch, M.D.; presented by the author. 'Journal of the Proceedings of the Linnean Society,' Vol. ii., No. 8; by the Society. 'The Natural History Review', Vol. v., No. 2; by the Dublin University Zoological Association. 'A Monograph of the Asiatic Species of Neptis and Athyma, two genera of Diurnal Lepidoptera belonging to the Family Nymphalidæ,' by Frederic Moore: 'Descriptions of some New Species of Lepidopterous Insects from Northern India,' by Frederic Moore; by the Author. 'Annales de la Société Entomologique Belge,' Tome premier; by the Society. 'Bibliotheca Historico-Naturalis,' Vol. vii., No. 1; by the Author, E. A. Zuchold. 'The Zoologist' for June, 1858; by the Editor. 'List of the Specimens of Lepidopterous Insects in the collection of the British Museum,' by Francis Walker, F.L.S., &c.; Part xiv. —Noctuidæ; by the Author. 'Report of the Proceedings of the First Meeting of the East Kent Natural History Society'; by Captain Cox. 'The Journal of the Society of Arts' for May; by the Society. 'The Literary Gazette' for May; by the Editor. 'Descriptions de Six Longicornes Exotiques Nouveaux,' par M. Chevrolat (from Archiv Entom.); presented by the Author.

Exhibitions.

Mr. Stevens exhibited a number of Coleoptera found in nests of Formica fuliginosa and F. rufa, amongst which were examples of Myrmedonia cognata and M. lugens, and a fine series of Dinarda Maerkelii, taken near Guildford, of which he distributed specimens amongst the members present.

Mr. Smith exhibited a specimen of Myrmica cingulata, found by Mr. S. Stevens in a nest of Formica fusca, and examples of Myrmica lippula and Ponera contracta, found by Mr. Janson in company with Formica fuliginosa; he wished those entomologists who were in the habit of searching for Coleoptera in ants' nests would bear in mind that several rare species of Myrmicidæ are only to be met with in the nests of the different species of Formica, and that two or three such species of Myrmica well known to continental entomologists have not yet been discovered in this country.

Mr. Janson exhibited an example of a species of Trichonyx, found by Mr. E. Shepherd in a colony of Formica flava, under a flint on the "Hogsback," near Guildford, on the 21st ult. Mr. Janson observed that it was the same species which he had alluded to in his paper on Coleoptera frequenting ants' nests, in the 'Entomologist's Annual' for 1857, but he had not yet been able to identify the insect with either of the two known continental species of this genus.

Mr. Janson also exhibited specimens of an Hemipterous insect which he had taken on several occasions in nests of Formica rufa at Hampstead and Highgate, and which he was disposed to refer to the Microphysa myrmecobia, *Maerkel*, in Germ. Zeitsch. f. d. Ent. v. 262, 276 (1844), with whose description the individuals before the Meeting agreed pretty closely, differing, however, somewhat in the sculpture of the head and thorax. He remarked that he had met with the male only, the female, according to Germar, has the hemelytra truncate—a structure obtaining in M. Pselaphiformis, *Westwood*, Annales de la Soc. Ent. de France, iii. 642, tab. vi. f. 3 (1834). [Loricula Pselaphiformis, *Curtis*, Ent. Mag. i. 197 (1833); Microphysa pselaphoides, *Burmeister*, Handb. d. Entom. ii. 286 (1835)], and which may possibly prove to be the female of the present species, although here the apical joints of the antennæ are decidedly the longest, and the rostrum is broad and scarcely exceeds the head in length.

Mr. Westwood observed that so long a period had elapsed since his attention was given to the species in question, that he could not then express an opinion in this matter; the specimen which Mr. Janson had placed in his hands would enable him to institute a comparison, the result of which he would communicate at a future time.

Mr. Stainton exhibited a specimen of a new species of Cemiostoma, bred by Mr. T. Wilkinson, from Lotus, and for which the name "Lotella" had been proposed: the insect is closely allied to C. scitella, from which it differs in the narrower anterior wings, the different position of the radiating dark lines in the cilia, and in having the apical spot from which these lines appear to emanate, black, instead of tawny as in scitella.

Mr. F. Smith exhibited two hermaphrodites in the aculeate Hymenoptera, *viz.*, a specimen of Nomada baccata, and of Andrena nitida; in both insects the male characters were on the right side of the body.

Mr. Douglas exhibited pupæ of a Lepidopterous insect found under bark of sycamore, and presumed to be those of Stigmonota Regiana; also a living example of Trinodes hirtus, and a specimen of Acrognathus mandibularis, a Coleopterous insect new to this country, taken at Darenth Wood, about three years ago.

Mr. Westwood exhibited a fine specimen of the Carpocapsa, which he had recently bred from the Mexican "jumping seeds," for which he proposed the name of

CARPOCAPSA SALTITANS.

C. *Alæ anticis griseo-albis cinereo rivulosis ; costa lineolis circiter* 16 *obliquis alternatim tenuibus, angulo apicali nigricanti plaga parva ovali albida ; margine postico prope basin macula parva quadrata nigricanti, plagaque postica magna conica cinerea, nigro lineata et marginata ; margine apicali griseo plumbeo et albo variegato serie duplici punctorum minutorum nigrorum ; alis posticis fuscis ; capite et collari brunnescentibus ; palpis extus fuscis, intus albidis.* Expans. alarum antic. lin. 9.

Hab.—Larva in seminibus plantæ Peruvianæ Calliguaja dictæ, quæ motu saltatorio mire progrediuntur.

Mr. Westwood exhibited a drawing, lately received by Mr. Spence from India, of the winged male and apterous worker of a species of Dorylus, together with the larva and pupa of the latter, which had been communicated to Herr Neitner by the Hon. Walter Elliot. The male is of the ordinary Dorylus form, that sex having only hitherto been observed, but the worker is a species of Mr. Westwood's genus Typhlopone. Herr Neitner's letter is as follows:—

"Rambodde, Ceylon, March 24, 1858.

"W. Spence, Esq., London.

"Dear Sir.—When at Madras, a few weeks ago, my friend the Hon. Walter Elliot showed me an entomological sketch, a copy of which I beg to enclose, asking me what the insect represented was. There can be no doubt that it is a Dorylus, and of great interest, as it represents two sexes, and as Mr. Elliot has observed their domestic habits. With regard to the latter, Mr. Elliot states that a couple of years ago he found a large society of these insects at Collenada, near Coringa, north of Madras, at about 17° N. L. They lived in the manner of ants, under the stone foundations of a house built on loose sand, within half-a-mile of the sea-coast: the society was very numerous. Mr. Elliot brought away a number of the insects, and had a drawing made of them by a native draughtsman: the enclosed sketch is a copy of it, also made by a native draughtsman. [The drawing represents the male insect of the natural size and in different positions, with magnified details of the antennæ, legs and genitalia ; also the worker of the natural size, and magnified with details, and with the larva and pupa]. There can be no doubt that these insects are closely allied to the social ants. The difference in size of the male and the worker is very remarkable. The female remains still to be discovered: still I feel confident that the enclosed sketch and Mr. Elliot's observations will interest you as much as they have interested me, and will be generally considered as an acceptable addition to the natural-history of the genus Dorylus."

Mr. Thwaites, by whom Herr Neitner's letter was transmitted to Mr. Spence, adds that "it is very interesting to find Shuckard's conjecture that Typhlopone would prove to be of the Dorylus family verified. Shuckard's paper on the subject is in the

3 AU 58

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CONTENTS.

Scent: an attempt to explain its Properties and Causes, *Rev. J. C. Atkinson, M.A.*, 6124.

Birds.—White Thrushes, Blackbirds, &c., *W. H. Slaney, Esq.*, 6142. Hooded Crows at Flambro' Head, *G. Norman, Esq.*, 6143. Occurrence of the Bee-eater at Kingsbridge, Devon, *Henry Nichols, Jun., Esq.*, 6143. Hawfinch Building at Tonbridge, *T. W. Greene, Esq.*, 6143. The Small Partridge, *John W. G. Spicer, Esq.*, 6144. Note on a Lapwing's Egg with Two Yolks, *J. H. Gurney, Esq.*, 6144. Domestic Ducks Nesting in a Church Tower, 6144.

Fishes.—Occurrence of the Short Sun-fish at Torquay, *P. H. Gosse, Esq.*, 6145.

Insects.—Colias Edusa, Macroglossa Fuciformis and M. Bombyliformis at Winchester, *J. S. Wesley, Esq.*, 6145. Correction of an Error, *Robert Drane, Esq.*, 6145. Occurrence of Clostera curtula in the Isle of Wight, *G. Guyon, Esq.*, 6145. Bankia Bankiana, *Edwin Birchall, Esq.*, 6145. The Larva of Xanthia Aurago, *Rev. B. H. Birks*, 6146. Capture of Camptogramma gemmata and fluviata at light, near London, *John Henry Tilly, Esq.*, 6146. Elachista Trapeziella: its Food and Transformations, *John Scott, Esq.*, 6146. Scolytus supposed to attack only unhealthy Trees: Cossus ligniperda does infest the Elm, *Edwin Parfitt, Esq.*, 6148. Scolytus supposed a secondary cause of injury: Cossus ligniperda does infest the Elm, *J. J. Reading, Esq.*, 6148. Beetles in Ants' Nests, *J. W. Douglas, Esq.*, 6148. Cossonus linearis, *Alfred Haward, Esq.*, 6150.

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